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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/092,906	03/08/2002	I-Larn Chen	SUND 289	2887
7590	03/17/2006		EXAMINER	
RABIN & BERDO, P.C. Suite 500 1101 14th Street, N.W. Washington, DC 20005			COUGHLAN, PETER D	
			ART UNIT	PAPER NUMBER
			2129	

DATE MAILED: 03/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/092,906	CHEN ET AL.
	Examiner	Art Unit
	Peter Coughlan	2129

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 13 January 2006.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) 27,29 and 30 is/are allowed.
- 6) Claim(s) 1-26,28 and 31-36 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 08 March 2002 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ . | 6) <input type="checkbox"/> Other: _____ . |

Detailed Action

1. This office action is in response to an AMENDMENT entered January 13, 2006 for the patent application 10/092906 filed on March 8, 2002.
2. The First Office Action of September 28, 2005 is fully incorporated into this Final Office Action by reference.

Possible Reasons for Allowance

3. One recommendation for possible allowance is the following. Using the input parameters from the IDE, AGP and PCI to help train a neural network for making changes in the clock multiplier factor which affects the CPU frequency.

Status of Claims

4. Claims 1-36 are pending.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable Zdravkovic in view of Sager(U. S. Patent 6715089, referred to as **Zdravkovic**; U. S. Patent 6216234, referred to as **Sager**)

Claim 1.

Zdravkovic teaches providing a plurality of environmental parameters that affect usage rate of the CPU with respect to components of the computer system when the CPU operates at a first frequency based on an external frequency (**Zdravkovic**, C1:21-43; 'First frequency' of applicant is equivalent to 'clock frequency of its microprocessor at initialization' of Zdravkovic.); calculating an output vector by inputting the environmental parameters to the neural network, wherein the output vector is determined according to a weighted sum of a plurality of basis vectors based on the environmental parameters. (**Zdravkovic**, C3:27-38)

Zdravkovic does not teach determining a clock multiplier factor according to the output vector.

Sager teaches determining a clock multiplier factor according to the output vector. (**Sager**, C1:36-43) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Zdravkovic by describing a clock multiplier as taught by Sager to determine a clock multiplier factor according to the output vector.

For the purpose of to reduce the number of pins needed.

Zdravkovic teaches changing the frequency of the CPU according to the output vector by enabling the CPU to operate at a second frequency according to the clock multiplier factor and the external frequency. (**Zdravkovic**, C3:27-38; 'Changing the frequency' of applicant is equivalent to 'adjust the clock control algorithm' of Zdravkovic.)

Claim Rejections - 35 USC § 103

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Zdravkovic and Sager, as set forth above, and further in view of Feng ('On-line adaptive chaotic demodulator based on radial-basis-function neural network', referred to as **Feng**).

Feng teaches the neural network is a radial basis function (**Feng**, abstract). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify a method for changing a frequency of a central processing unit (CPU) under the control of a neural network of Zdravkovic and Sager

with using a neural network of a radial basis function design by Feng. The radial neural network is a 3 layer design. The first layer has the same number of inputs nodes as environmental parameters. The intermediate layer has as many nodes as functions that correspond to the parameters. The final layer is a single node which outputs the desired answer.

Claim Rejections - 35 USC § 103

7. Claims 3, 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Zdravkovic and Sager, as set forth above, and further in view of Lin. (U. S. Patent 6,163,583, referred to as Lin)

Claim 3.

Zdravkovic and Sager do not teach the environmental parameters comprise a clock multiplier factor that the CPU uses currently.

Lin teaches the environmental parameters comprise a clock multiplier factor that the CPU uses currently (Lin, C4:25-28; EN Output on 220 is the current clock rate. 'Parameters' of applicant is equivalent to 'circumstances' of Lin.). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic and Sager by illustrating how a clock multiplier factor is associated with a CPU as taught by Lin to have the environmental parameters comprise a clock multiplier factor that the CPU uses currently.

For the purpose of being able to change the clock multiplier factor.

Claim 4.

The combination of Zdravkovic and Sager do not teach a environmental parameters comprise a clock multiplier factor that the CPU uses previously.

Lin teaches a environmental parameters comprise a clock multiplier factor that the CPU uses previously. (Lin, C3:65 through C4:37; EN The previous clock rate is F1. 'Parameters' of applicant is equivalent to 'circumstances' of Lin.)

It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic and Sager by having what the current clock multiplier factor value as an input to determine the new clock multiplier factor as taught by Lin to have a environmental parameters comprise a clock multiplier factor that the CPU uses previously.

For the purpose of computing an efficient clock multiplier factor that satisfies other current parameters.

Claim Rejections - 35 USC § 103

8. Claims 5, 6, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Zdravkovic and Sager, as set forth above, and further in view of Hewlett. ('HP Kayak XU800 PC Workstation, Technical Reference Manual', referred to as **Hewlett**)

Claim 5.

Zdravkovic and Sager do not teach do not teach an environmental parameters comprise a data accessing condition for an IDE (Intelligent Drive Electronics) controller.

Hewlett teaches an environmental parameters comprise a data accessing condition for an IDE (Intelligent Drive Electronics) controller (**Hewlett**, p10, C1:11). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic and Sager, Feng by using the current status of the IDE as taught by Hewlett to have an environmental parameters comprise a data accessing condition for an IDE (Intelligent Drive Electronics) controller.

For the purpose of taking into account the IDE status to determine the clock multiplier factor.

Claim 6.

The combination of Zdravkovic and Sager do not teach an environmental parameters comprise a data accessing condition for a DMA (Direct Memory Access) controller.

Hewlett teaches an environmental parameters comprise a data accessing condition for a DMA (Direct Memory Access) controller (**Hewlett**, p104, 19-25). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic and Sager by using the current DMA status as input as taught by Hewlett to have an environmental parameters comprise a data accessing condition for a DMA (Direct Memory Access) controller.

For the purpose of using the current DMA status to determine the clock multiplier factor.

Claim 7.

The combination of Zdravkovic and Sager, Feng do not teach an environmental parameters comprise a data accessing condition for an AGP (Accelerated Graphics Port) interface.

Hewlett teaches an environmental parameters comprise a data accessing condition for an AGP (Accelerated Graphics Port) interface (**Hewlett**, p30, 13-22). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic and Sager by using the current status of the APG as input as taught by Hewlett to have an environmental parameters comprise a data accessing condition for an AGP (Accelerated Graphics Port) interface.

For the purpose of using the current status of the AGP to determine the clock factor multiplier.

Claim 8.

The combination of Zdravkovic and Sager do not teach an environmental parameters comprise a data accessing condition for a PCI Peripheral Component Interconnect) interface.

Hewlett teaches an environmental parameters comprise a data accessing condition for a PCI Peripheral Component Interconnect) interface (**Hewlett**, p31, 9-32).

It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic and Sager by using the current status of the PCI interface as input as taught by Hewlett to have teach an environmental parameters comprise a data accessing condition for a PCI Peripheral Component Interconnect) interface.

For the purpose of using the current status of the PCI to generate the clock multiplier factor.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9, 10, 11, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zdravkovic in view of Sager, and further in view of Feng (U. S. Patent 6715089, referred to as **Zdravkovic**; U. S. Patent 6216234, referred to as **Sager**; 'On-line adaptive chaotic demodulator based on radial-basis-function neural network', referred to as **Feng**)

Claim 9.

Zdravkovic teaches providing n environmental parameters that affect usage rate of the CPU with respect to components of the computer system when the CPU operates at a first frequency based on an external frequency (**Zdravkovic**, C1:21-43 & C3:27-38; ‘First frequency’ of applicant is equivalent to ‘clock frequency of its microprocessor at initialization’ of Zdravkovic. ‘N environmental parameters’ of applicant is equivalent to ‘additional inputs’ of Zdravkovic.);

Zdravkovic and Sager do not teach calculating m basis vectors by substituting the n environmental parameters into the m basis functions.

Feng teaches calculating m basis vectors by substituting the n environmental parameters into the m basis functions. (**Feng**, p026202-4, C1:6-8 and 15-20) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify combined teachings Zdravkovic and Sager by having the neural network calculate m basis vectors as taught by Feng by calculating m basis vectors by substituting the n environmental parameters into the m basis functions.

For the purpose of completing the first step within the neural network pertaining to the input level to the hidden layer.

Zdravkovic and Sager do not teach calculating an output vector according to the m basis weights and the m basis vectors, wherein the output vector is determined according to a weighted sum of the m basis vectors with the m basis weights.

Feng teaches calculating an output vector according to the m basis weights and the m basis vectors, wherein the output vector is determined according to a weighted sum of the m basis vectors with the m basis weights. (**Feng**, p026202-4; ‘M basis

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vectors' and 'm basis weights' of applicant is equivalent to 'w' and 'c' of Feng.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic and Sager by illustrating the contents of the neural network from the hidden layer to the output layer as taught by Feng) to calculate an output vector according to the m basis weights and the m basis vectors, wherein the output vector is determined according to a weighted sum of the m basis vectors with the m basis weights.

For the purpose of computing a final result from the input parameters set the new CPU rate.

Zdravkovic does not teach determining a clock multiplier factor according to the output vector.

Sager teaches determining a clock multiplier factor according to the output vector. (**Sager**, C1:36-43) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify teachings of Zdravkovic by using a clock multiplier to generate a new CPU rate as taught by Sager to determine a clock multiplier factor according to the output vector.

For the purpose of computing this value of the clock multiplier factor to possible alter the CPU rate.

Zdravkovic does not teach changing the frequency of the CPU according to the output vector by enabling the CPU to operate at a second frequency according to the clock multiplier factor and the external frequency, wherein m and n are positive integers.

Sager teaches changing the frequency of the CPU according to the output vector by enabling the CPU to operate at a second frequency according to the clock multiplier factor and the external frequency, wherein m and n are positive integers. (**Sager**, C1:36-43; The clock multiplier factor sets the CPU frequency. If the clock multiplier factor changes then the CPU frequency changes. 'M' and 'n' have to be positive integers because one can not have negative amount of input parameters.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify teachings of Zdravkovic by illustrating the principle if the clock multiplier factor changes then the CPU frequency changes as taught by Sager to change the frequency of the CPU according to the output vector by enabling the CPU to operate at a second frequency according to the clock multiplier factor and the external frequency, wherein m and n are positive integers.

For the purpose of setting a new CPU frequency determined by the neural network based upon the input parameters.

Claims 10 and 11.

Zdravkovic and Sager do not teach the neural network is a radial basis function.

Feng teaches the neural network is a radial basis function (**Feng**, abstract). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify a method for changing a frequency of a central processing unit (CPU) under the control of a neural network of Zdravkovic and Sager with using a neural network of a radial basis function design by Feng. The radial neural

network is a 3 layer design. The first layer has the same number of inputs nodes as environmental parameters. The intermediate layer has as many nodes as functions that correspond to the parameters. The final layer is a single node which outputs the desired answer.

Claim 12.

Zdravkovic and Sager do not teach the radial basis function is a Gaussian function.

Feng teaches the radial basis function is a Gaussian function (**Feng**, p026202-4, C1:20-26). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify a method for changing a frequency of a central processing unit (CPU) under the control of a neural network of Lin Zdravkovic and Sager with the radial basis function is a Gaussian function of Feng.

The characteristic of a Gaussian function, is the influence of each environmental parameter on the CPU clock multiplier factor can be outstood.

Claim 13.

Zdravkovic and Sager do not teach the radial basis function is a multiquadric function.

Feng teaches the radial basis function is a multiquadric function (**Feng**, p026202-4, C1:20-26). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify a method for changing a frequency of a

central processing unit (CPU) under the control of a neural network of Lin with the radial basis function is a multiquadric function of Feng.

Using the characteristic of the multiquadric function, the effect of input parameters on the CPU clock multiplier factor can be outstood.

Claim Rejections - 35 USC § 103

10. Claims 14, 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Zdravkovic, Sager and Feng, as set forth above, and further in view of Lin. (U. S. Patent 6,163,583, referred to as Lin)

Claims 14.

Zdravkovic, Sager and Feng do not teach the environmental parameters comprise a clock multiplier factor that the CPU uses currently.

Lin teaches the environmental parameters comprise a clock multiplier factor that the CPU uses currently (Lin, C4:25-28; EN Output on 220 is the current clock rate. 'Parameters' of applicant is equivalent to 'circumstances' of Lin.). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic, Sager and Feng by illustrating how a clock multiplier factor is associated with a CPU as taught by Lin to have the environmental parameters comprise a clock multiplier factor that the CPU uses currently.

For the purpose of being able to change the clock multiplier factor.

Claims 15.

The combination of Zdravkovic, Sager and Feng do not teach a environmental parameters comprise a clock multiplier factor that the CPU uses previously.

Lin teaches a environmental parameters comprise a clock multiplier factor that the CPU uses previously. (Lin, C3:65 through C4:37; EN The previous clock rate is F1. 'Parameters' of applicant is equivalent to 'circumstances' of Lin.)

It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic, Sager and Feng by having what the current clock multiplier factor value as an input to determine the new clock multiplier factor as taught by Lin to have a environmental parameters comprise a clock multiplier factor that the CPU uses previously.

For the purpose of computing an efficient clock multiplier factor that satisfies other current parameters.

Claim Rejections - 35 USC § 103

11. Claims 16, 17, 18 and 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Zdravkovic, Sager and Feng, as set forth above, and further in view of Hewlett. ('HP Kayak XU800 PC Workstation, Technical Reference Manual', referred to as **Hewlett**)

Claim 16.

Zdravkovic, Sager and Feng do not teach do not teach an environmental parameters comprise a data accessing condition for an IDE (Intelligent Drive Electronics) controller.

Hewlett teaches an environmental parameters comprise a data accessing condition for an IDE (Intelligent Drive Electronics) controller (**Hewlett**, p10, C1:11). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic, Sager and Feng by using the current status of the IDE as taught by Hewlett to have an environmental parameters comprise a data accessing condition for an IDE (Intelligent Drive Electronics) controller.

For the purpose of taking into account the IDE status to determine the clock multiplier factor.

Claim 17.

The combination of Zdravkovic, Sager and Feng do not teach an environmental parameters comprise a data accessing condition for a DMA (Direct Memory Access) controller.

Hewlett teaches an environmental parameters comprise a data accessing condition for a DMA (Direct Memory Access) controller (**Hewlett**, p104, 19-25). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic, Sager and Feng by using the

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current DMA status as input as taught by Hewlett to have an environmental parameters comprise a data accessing condition for a DMA (Direct Memory Access) controller.

For the purpose of using the current DMA status to determine the clock multiplier factor.

Claim 18.

The combination of Zdravkovic, Sager and Feng do not teach an environmental parameters comprise a data accessing condition for an AGP (Accelerated Graphics Port) interface.

Hewlett teaches an environmental parameters comprise a data accessing condition for an AGP (Accelerated Graphics Port) interface (**Hewlett**, p30, 13-22). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic, Sager and Feng by using the current status of the APG as input as taught by Hewlett to have an environmental parameters comprise a data accessing condition for an AGP (Accelerated Graphics Port) interface.

For the purpose of using the current status of the AGP to determine the clock factor multiplier.

Claim 19.

The combination of Zdravkovic, Sager and Feng do not teach an environmental parameters comprise a data accessing condition for a PCI Peripheral Component Interconnect) interface.

Hewlett teaches an environmental parameters comprise a data accessing condition for a PCI Peripheral Component Interconnect) interface (Hewlett, p31, 9-32). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic, Sager and Feng by using the current status of the PCI interface as input as taught by Hewlett to have teach an environmental parameters comprise a data accessing condition for a PCI Peripheral Component Interconnect) interface.

For the purpose of using the current status of the PCI to generate the clock multiplier factor.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feng in view of Zdravkovic and further in view of Sager ('On-line adaptive chaotic demodulator based on radial-basis-function neural network', referred to as Feng;

U. S. Patent 6715089, referred to as **Zdravkovic**; U. S. Patent 6216234, referred to as **Sager**)

Claim 20.

Feng teaches a method for changing a frequency of a central processing unit (CPU) under the control of a neural network of a computer system, wherein the neural network comprises m basis functions, the method comprising steps of (i) executing a learning procedure, step (i) comprising: providing p pseudo dummy environmental parameters (**Feng**, p026202-5, C2:25 through p026202-6, C1:5; ‘Environmental parameters’ of applicant is equivalent to ‘ $x_1[\alpha]$ ’ of Feng.) providing a pseudo dummy output vector (**Feng**, p026202-5; C2:25 through p026202-6, C1:5; ‘Pseudo dummy output’ of applicant is equivalent to ‘ $h[\beta]$ ’ of Feng.); and calculating m basis weights by the neural network according to the p pseudo dummy environmental parameters and pseudo the dummy output vector. (**Feng**, p026202-5, C2:25 through p026202-6, C1:5; ‘Calculating weights’ of applicant is equivalent to ‘steps to converge’ of Feng.)

Feng does not teach (ii) executing an application procedure, step (ii) comprising: providing n environmental parameters that affect usage rate of the CPU with respect to components of the computer system when the CPU operates at a first frequency based on an external frequency.

Zdravkovic teaches (ii) executing an application procedure, step (ii) comprising: providing n environmental parameters that affect usage rate of the CPU with respect to components of the computer system when the CPU operates at a first frequency based

on an external frequency. (**Zdravkovic**, C1:21-43; 'External frequency' of applicant is equivalent to 'initialization' of Zdravkovic.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Feng by providing training parameters and inputting training parameters and modifying weights to have (ii) executing an application procedure, step (ii) comprising: providing n environmental parameters that affect usage rate of the CPU with respect to components of the computer system when the CPU operates at a first frequency based on an external frequency.

For the purpose using environmental status to help determine the CPU frequency.

Feng teaches calculating m basis vectors by substituting the n environmental parameters into the m basis functions (**Feng**, P026202-4, C1 FIG. 4; 'M basis functions' of applicant is equivalent to 'input layer' of Feng.); calculating an output vector according to the m basis weights calculated in the learning procedure and the m basis vectors, wherein the output vector is determined according to a weighted sum of the m basis vectors with the m basis weights. (**Feng**, P026202-4, C1 FIG. 4; 'Output vector' of applicant is equivalent to 'h(Z)' of Feng.)

Feng and Zdravkovic do not teach determining a clock multiplier factor according to the output vector.

Sager teaches determining a clock multiplier factor according to the output vector. (**Sager**, C1:36-43) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify teachings of Feng and Zdravkovic

by using a clock multiplier factor to determine the CPU frequency as taught by Sager to determine a clock multiplier factor according to the output vector.

For the purpose of having the CPU run at a frequency that is efficient for the given parameters.

Feng does not teach changing the frequency of the CPU according to the output vector by enabling the CPU to operate at a second frequency according to the clock multiplier and the external frequency, wherein m, n and p are positive integers.

Zdravkovic teaches changing the frequency of the CPU according to the output vector by enabling the CPU to operate at a second frequency according to the clock multiplier and the external frequency, wherein m, n and p are positive integers.

(**Zdravkovic**, C3:27-38) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Feng by providing training parameters and inputting training parameters and modifying weights to change the frequency of the CPU according to the output vector by enabling the CPU to operate at a second frequency according to the clock multiplier and the external frequency, wherein m, n and p are positive integers.

For the purpose using industrial standard of a clock multiplier to set the CPU frequency.

Claims , 21 and 22.

Feng teaches the neural network is a radial basis function. (**Feng**, abstract; The radial neural network is a 3 layer design. The first layer has the same number of inputs nodes as environmental parameters. The intermediate layer has as many nodes as

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functions that correspond to the parameters. The final layer is a single node which outputs the desired answer.)

Claim 23.

Feng teaches the radial basis function is a Gaussian function (**Feng**, p026202-4, C1:20-26).

Claim 24.

Feng teaches the radial basis function is a multiquadric function (**Feng**, p026202-4, C1:20-26).

Claim Rejections - 35 USC § 103

13. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Feng, Zdravkovic and Sager, as set forth above, and further in view of Asghar (U. S. Patent 6219642, referred to as **Asghar**)

Claim 25.

Zdravkovic, Sager and Feng do not teach the dummy environmental parameters comprise a clock multiplier factor that the CPU uses currently.

Asghar teaches the dummy environmental parameters comprise a clock multiplier factor that the CPU uses currently. (**Asghar**, 26:40-49) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zfravkovic, Sager and Feng by using current CPU frequency as training input as taught by Asghar to have the dummy environmental parameters comprise a clock multiplier factor that the CPU uses currently.

For the purpose of training the system to take into account what the current CPU frequency is to compute the new clock multiplier factor.

Claim 26.

Zfravkovic, Sager and Feng do not teach the dummy environmental parameters comprise a clock multiplier factor that the CPU uses used previously.

Asghar teaches the dummy environmental parameters comprise a clock multiplier factor that the CPU uses used previously. (**Asghar**, 26:40-49) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zfravkovic, Sager and Feng by taking into account what the previous CPU frequency was for training as taught by Asghar to have the dummy environmental parameters comprise a clock multiplier factor that the CPU uses used previously.

For the purpose of training the system to compute the new clock multiplier factor with taking into account the previous CPU frequency.

Claim Rejections - 35 USC § 103

14. Claims 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Feng, Zdravkovic and Sager, as set forth above, and further in view of Lin (U. S. Patent 6,163,583, referred to as Lin)

Claim 31.

Zdravkovic, Sager and Feng do not teach the environmental parameters comprise a clock multiplier factor that the CPU uses currently.

Lin teaches the environmental parameters comprise a clock multiplier factor that the CPU uses currently (Lin, C4:25-28; EN Output on 220 is the current clock rate. 'Parameters' of applicant is equivalent to 'circumstances' of Lin.). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic, Sager and Feng by illustrating how a clock multiplier factor is associated with a CPU as taught by Lin to have the environmental parameters comprise a clock multiplier factor that the CPU uses currently.

For the purpose of being able to change the clock multiplier factor.

Claim 32.

The combination of Zdravkovic, Sager and Feng do not teach a environmental parameters comprise a clock multiplier factor that the CPU uses previously.

Lin teaches environmental parameters comprise a clock multiplier factor that the CPU uses previously. (Lin, C3:65 through C4:37; EN The previous clock rate is F1. 'Parameters' of applicant is equivalent to 'circumstances' of Lin.)

It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic, Sager and Feng by having what the current clock multiplier factor value as an input to determine the new clock multiplier factor as taught by Lin to have environmental parameters comprise a clock multiplier factor that the CPU uses previously.

For the purpose of computing an efficient clock multiplier factor that satisfies other current parameters.

Claim Rejections - 35 USC § 103

15. Claims 27-30 and 33-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Feng, Zdravkovic and Sager, as set forth above, and further in view of Hewlett. ('HP Kayak XU800 PC Workstation, Technical Reference Manual', referred to as **Hewlett**)

Claims 27 and 33.

Zdravkovic, Sager and Feng do not teach do not teach an environmental parameters comprise a data accessing condition for an IDE (Intelligent Drive Electronics) controller.

Hewlett teaches an environmental parameters comprise a data accessing condition for an IDE (Intelligent Drive Electronics) controller (**Hewlett**, p10, C1:11). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic, Sager and Feng by using the current status of the IDE as taught by Hewlett to have an environmental parameters comprise a data accessing condition for an IDE (Intelligent Drive Electronics) controller.

For the purpose of taking into account the IDE status to determine the clock multiplier factor.

Claims 28 and 34.

The combination of Zdravkovic, Sager and Feng do not teach an environmental parameters comprise a data accessing condition for a DMA (Direct Memory Access) controller.

Hewlett teaches an environmental parameters comprise a data accessing condition for a DMA (Direct Memory Access) controller (**Hewlett**, p104, 19-25). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic, Sager and Feng by using the

current DMA status as input as taught by Hewlett to have an environmental parameters comprise a data accessing condition for a DMA (Direct Memory Access) controller.

For the purpose of using the current DMA status to determine the clock multiplier factor.

Claims 29 and 35.

The combination of Zdravkovic, Sager and Feng do not teach an environmental parameters comprise a data accessing condition for an AGP (Accelerated Graphics Port) interface.

Hewlett teaches an environmental parameters comprise a data accessing condition for an AGP (Accelerated Graphics Port) interface (Hewlett, p30, 13-22). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic, Sager and Feng by using the current status of the APG as input as taught by Hewlett to have an environmental parameters comprise a data accessing condition for an AGP (Accelerated Graphics Port) interface.

For the purpose of using the current status of the AGP to determine the clock factor multiplier.

Claims 30 and 36.

The combination of Zdravkovic, Sager and Feng do not teach an environmental parameters comprise a data accessing condition for a PCI Peripheral Component Interconnect) interface.

Hewlett teaches an environmental parameters comprise a data accessing condition for a PCI Peripheral Component Interconnect) interface (Hewlett, p31, 9-32). It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify combined teachings of Zdravkovic, Sager and Feng by using the current status of the PCI interface as input as taught by Hewlett to have teach an environmental parameters comprise a data accessing condition for a PCI Peripheral Component Interconnect) interface.

For the purpose of using the current status of the PCI to generate the clock multiplier factor.

Response to Arguments

16. The rejection of Claim 20 under 35 U. S. C. § 112, first paragraph is withdrawn.

17. Applicant's arguments filed on January 13, 2006 for claims 1-26, 28, 31-36 have been fully considered but are not persuasive.

18. In reference to the Applicant's argument:

In particular, Lin does not disclose or suggest that an output vector is determined according to a weighted sum of a plurality of basis vectors based on

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environmental parameters and that a clock multiplier factor is determined according to the output vector, wherein the frequency of the CPU is changed according to the output vector by enabling the CPU to operate at a second frequency according to the clock multiplier factor and an external frequency.

Examiner's response:

Zdravkovic teaches a neural network which contains weighted sum of a plurality of basis vectors. (**Zdravkovic**, C3:27-38) Sager teaches a clock multiplier factor which affects the CPU frequency. (**Sager**, C1:36-43) Zdravkovic teaches the neural network can control the clock control (clock multiplier factor) that will result in the CPU operating at a new secondary frequency.

19. In reference to the Applicant's argument:

This teaching does not disclose or otherwise suggest the features as recited in amended claim I, that an output vector is calculated by inputting environmental parameters to a neural network, wherein the output vector is determined according to a weighted sum of a plurality of basis vectors based on the environmental parameters.

Examiner's response:

Zdravkovic teaches a neural network which computes a output vector that is the result from input vector components. (**Zdravkovic**, C3:27-38) Feng teaches a weighted sum of a plurality of basis vectors. (**Feng**, p026202-4, FIG.4) Puskorius and Asghar teach inputting environmental parameters. (**Puskorius**, C3:27-55) & (**Asghar**, C26:40-49)

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20. In reference to the Applicant's argument:

Lin does not teach or suggest the use of a neural network in Lin's dynamic clocking apparatus. In addition, one may ask how Lin's finite state machine circuit 206 would be modified or replaced by a neural network circuit.

Examiner's response:

Zdravkovic teaches a neural network that has the capability of dynamically controlling the clock control algorithm.

21. In reference to the Applicant's argument:

However, in rejecting claim 1, the Office Action provides no teaching, suggestion, or motivation to do so. On the other hand, Alon does provide the disapproving conclusion that "parallel hardware inspired by this somewhat primitive neural model is unlikely to host arbitrary finite automata with uniform high efficiency: Some automata will require networks that require about as many neurons as the automata have states!" (Emphasis added; see page 496 of the Alon paper, second paragraph.) In addition, Alon admits that "a careful reading of this paper may produce the impression that more complicated neural network models will suffer from the same inherent inefficiency." (Emphasis added; again, see the second paragraph on page 496.)

Examiner's response:

Zdravkovic teaches a neural network that can adjust a clock control algorithm. And this neural network can be learned. Sager teaches a 'clock multiplier factor' which is equivalent to Zdravkovic's 'clock control algorithm'. Feng goes into detail about the basic structure of a generic neural network. Hewlett illustrates DMA, AGP, PCI and IDE which are common in the industry. Puskorius and Asghar teach using past and present CPU frequencies and DMA information for neural network training.

Examination Considerations

22. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, I 45-48; p 2100-9, c 1, I 1-4). The Examiner has the full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

23. Examiner's Notes are provided to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and spirit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but link to prior art that one of ordinary skill in the art would find inherently appropriate.

24. Examiner's Opinion: Paragraphs 22 and 23 apply. The Examiner has full latitude to interpret each claim in the broadest reasonable sense.

Conclusion

25. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

26. Claims 1-26, 28, 31-36 are rejected.

Correspondence Information

27. Any inquiry concerning this information or related to the subject disclosure should be directed to the Examiner Peter Coughlan, whose telephone number is (571) 272-5990. The Examiner can be reached on Monday through Friday from 7:15 a.m. to 3:45 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor David Vincent can be reached at (571) 272-3687. Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,
Washington, D. C. 20231;

Hand delivered to:

Receptionist,
Customer Service Window,
Randolph Building,
401 Dulany Street,
Alexandria, Virginia 22313,
(located on the first floor of the south side of the Randolph Building);
or faxed to:
(571) 273-8300 (for formal communications intended for entry.)

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Peter Coughlan

3/2/2006



3/15/06
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